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THE CONTROL OF LOOSE SMUT IN WHEAT

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Loose smut of wheat is that type of smut producing no smut balls. It resembles to all intents and purposes oat smut, completely destroying the grain, and producing ears covered with a sooty-black, loose deposit of spores. It has been on the increase in recent years and before it becomes more serious and widespread, attention is directed to the only known method for its control. This method is unfortunately cumbersome, costly and difficult, but it is at present the only means known to combat this form of smut. The disease germ lives *in* the grain and not *on* the grain, as do bunt or stinking smut, hence ordinary methods so useful in combating the latter are of no use whatsoever in treating loose smut. Nevertheless grain treated in this manner for loose smut will show no other kind of smut.

PURCHASE CLEAN SEED WHEAT

The first aim should be to secure one's seed grain free from loose smut. Seed grain has no business to be certified if it contains even slight traces of loose smut. Having secured seed grain from a doubtful source or one known to be even slightly infected with loose smut, the grain, or at least as large a quantity of it as possible, should be treated as hereinafter described.

SEED PLOT

The seed should then be sown on a special seed plot, some distance away from any other wheat crops. Have a field of corn, potatoes, or hay between your seed plot and other wheat. Sow at a slightly increased rate per acre, since germination frequently suffers unless the treatment has been very carefully practised. Go over this seed plot towards heading time, or as soon as smut is noticed, and pull up all of the plants showing a diseased ear, and remove from the field in a bag. Remember if you delay "roguing" your seed plot until the wheat is in flower you are too late. Roguing must be completed before that time, since this smut infects the wheat only while in bloom. Harvest your seed plot separately and use for seed purposes for your next crop. If roguing smutted plants has been done carefully and if you take care not to introduce infected wheat in future, your losses from this smut will have been effectively eliminated.

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DOMINION EXPERIMENTAL FARMS

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HOT WATER TREATMENT

Unless you have exceptional facilities for treating large quantities of wheat, don't attempt it, but treat only for a seed plot large enough to yield sufficient seed for your main crop the year after.

(a) Preliminary Treatment (Soaking)

Apparatus required.—1. One reliable thermometer; the ordinary bath-tub or room thermometer is very undesirable for this purpose, but a good dairy thermometer will serve the purpose well.

2. One large wooden barrel or any kind of metal tank or large vat.

3. A number of good strong grain bags which will allow the water to pass through rapidly.

4. Some kind of stove, boiler, or fireplace to heat the water.

Procedure.—1. Heat water in the boiler to almost boiling. Pour into large barrel or tank (before proceeding further refill the boiler with water) and add slowly, with vigorous stirring, cold water until the temperature is exactly 86°F. Unless the water is well stirred the correct temperature cannot be taken. Read the temperature without removing the thermometer from the water. The mercury bulb should always remain submerged when taking the reading.

2. Fill grain bags three-quarters full with the grain to be treated and tie them up loosely. Immerse into barrel with water at 86°F., move bag several times up and down, which will force out the air quickly. Take care the water covers the grain at least several inches. Allow the grain to remain in this water four hours.

NOTE.—The temperature of the water will become lower when the grain is introduced. Should it cool down too quickly—i.e., sink below 68°F.—allow five hours for soaking.

Treat the grain, if possible, in a heated room to prevent the rapid sinking of the temperature. By placing the barrel or tank in a large wooden box, tightly packed with wood shavings, hay or straw all around, and covering it with a lid, the temperature remains fairly constant for four hours, once the grain has assumed the temperature of the water. One ordinary barrel will treat about one bushel of grain or a little more. Use two or three barrels or one of larger size if more grain is to be treated. The larger the barrel and the greater the volume of water, the more easily will the temperature be kept constant.

(b) Main Treatment with Hot Water

Additional requirements.—Two large barrels or vats, each capable of holding from two to three bags of grain. A water can with a sprinkler attached.

Procedure.—Into the first barrel pour a quantity of nearly boiling water and add cold water slowly until the temperature is accurately 112°F. (Fill up the boiler immediately, as more water will be required in a short while.) Then take out the grain from the "soaking" barrel and place in this one. Move several times up and down and allow to remain for fifteen to twenty minutes.

Meanwhile prepare the other barrel; pour in hot water as near boiling as possible, add cold water slowly, with stirring, until the temperature is exactly 129°F. Then take the bags out of the second barrel (the one with the water at 112°F.) and place in the barrel with water at 129°F. This will cause the temperature to sink to some extent; should it sink below 122°F. fill the sprinkling can with hot water and sprinkle into the barrel, but under no circumstances

upon the grain or the bags containing it. When, however, the bags are well covered with water, at least four or fine inches, the hot water may be safely added. To mix it with the whole contents lift the bags up and down, or move them around the barrel. The grain must remain for exactly ten minutes in this last barrel, during which time the water should be maintained evenly at a temperature from 124°F.-127°F. It should never sink below 122°F. nor be hotter than 129°F. The former will be ineffectual in killing the smut; the latter will cause unnecessary damage to the grain.

(c) Drying the Treated Grain

Of all the difficulties of this hot water treatment, the complaints about the trouble in drying grain after treatment exceed all others. When taking the bags out allow them to drain thoroughly. On sunny days the grain may be spread out in a thin layer in the open air, when shovelling or moving it with a wooden rake will render it sufficiently dry for sowing in a few hours. When the temperature is below freezing, or on dull or rainy days, the grain should be spread out in a thin layer on the clean, dry floor of the barn. It is most important to keep on shovelling the grain over to allow of air being mixed with it, when it will dry far more quickly. Besides, grain which is left lying untouched is liable to become mouldy, and this will destroy its germination. At times, especially on dull days, it is advisable to chill the grain by placing the bags for a minute or two in cold water, moving the bags several times up and down before spreading it out for drying. This has been found of advantage. In rare cases, grain has begun to sprout while spread out for drying. This causes no harm whatever, providing the grain is sown before it is absolutely dry. In the laboratory, we have found that grain that has sprouted and has been allowed to get fairly dry will revive completely when sown without much delay, and grow just as well as untreated seed. Barley is also subject to loose smut and may be treated in exactly the same way.

For more detailed information relating to the life history of this smut and on smut generally write the Publications Branch, Department of Agriculture, Ottawa, for Bulletin 81, New Series: Smut Diseases of Cultivated Plants, their Cause and Control, by Gűssow and Conners.

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